

Cindy H. Wu
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EDUCATION

- 2006 PhD Environmental Toxicology, Department of Cell Biology & Neuroscience
University of California, Riverside.

Thesis: Applications of Recombinant Bacteria for Remediation and Detection of Heavy Metals
- 1999 Master of Environmental Science and Management, Donald Bren School of Environmental Science
and Management, University of California, Santa Barbara.

Thesis: An Integrated Approach to Managing Coastal Bacterial Pollution
- 1996 BS Environmental Science Policy and Management (Biological Sciences Emphasis)
University of California, Berkeley.

RESEARCH EXPERIENCE

2007-present Post Doctoral Researcher, Earth Sciences Division, Lawrence Berkeley National Laboratory

The research involves use of genomics tools such as the Affymetrix 16S microarrays to elucidate questions regarding environmental bacterial distribution in the areas of public health and bioremediation.

2001 – 2006 Graduate Researcher, Dept of Chemical & Environmental Engineering
University of California, Riverside.

The research focuses were to genetically engineer a rhizosphere bacterium (*Pseudomonas putida*) to enhanced heavy metal removal and trichloroethylene degradation in soil, and construct a genetic toggle switch whole cell biosensor using the metal resistant *cad* operon for the detection of cadmium. Colonization efficiency of the engineered rhizobacterium on plant root was determined using fluorescent in situ hybridization, confocal scanning laser microscopy and flow cytometry. Other duties in the lab included serving as lab manager for 1.5 years, and training 5 undergraduate students in molecular cloning techniques.

1998 Research Assistant, Bren School of Environmental Science & Management. University of California, Santa Barbara.

Research tasks included investigating nutrient requirements for a hydrocarbon degrading *Pseudomonas aeruginosa*, and measuring growth rates using hexadecane as substrate. Experiments were performed on hydrocarbon digestion in liquid and sand cultures using *P. aeruginosa*. Surface tension measurements were performed using a tensiometer. Hydrocarbon degradation was measured with gas chromatography.

RELATED EXPERIENCE

2002 Teaching Assistant, Department of Environmental Sciences.
University of California, Riverside.

Introduction to Soil Science Laboratory Work with the other teaching assistants in designing and preparing laboratory experiments. Experiments included identifying different minerals, determining particle sizes, and pH in the soil. Tasks also included conducting discussion and review sessions for the students.

2000 – 2001 Environment Health Technician Ocean Monitoring Program
Santa Barbara County Environmental Health Services.

The main tasks were to sample ocean water, statistically analyze data, post results on the web and in the field to inform the public of the up –to – date bacterial counts. Other tasks included writing public service announcements regarding, developing website for the program, writing funding proposals for rapid bacterial detection technology, and investigating reports of ocean pollution or allegations of illnesses as a result of ocean water. Mainly, the purpose of the job was to act as liaison between general public,

community groups, other government agencies, and similar programs in other jurisdictions, as well as, provided public education of recreational water policy and county protocols.

OTHER EXPERIENCE

1997 Field Assistant, Department of Ecology, Evolution, and Marine Biology
University of California, Santa Barbara.

Research tasks included setting up field experiments to test the effects of fire on California native plant seedling, collecting field data on germination rate of different seeds.

1994 – 1996 Field Assistant, College of Natural Resources
University of California, Berkeley.

The first research focused on resource partitioning study of carnivorous predators (bobcats, bears, foxes and coyotes) at a northern Californian preserve. Tasks included collecting and processing scats, and identifying preys from skulls and teeth in the predator scats. The second project focused on the effects of ice plants (*Carprobrotus* spp.), an exotic coastal plant species, on native plants and wildlife. Tasks included experimental design, measuring length of plants in the field, and statistically analyzing field data.

TECHNICAL SKILLS

General molecular cloning techniques. Chemical and electroporation transformation with bacterial plasmids. Chromosomal integration with *Rhizobium* and *Pseudomonas* spp.. Polymerase Chain Reaction. SDS-PAGE gel. Western Blotting. Protein purification. Atomic Absorption Spectrometry. Gas chromatography. Fluorescence In Situ Hybridization (FISH). Flow cytometry. Confocal Laser Scanning Microscopy (CLSM). Affymetrix microarray analysis.

LANGUAGES

Fluent in English, and Mandarin Chinese. Conversational Spanish. Knowledgeable with French.

PUBLICATIONS

Cindy H. Wu, David Le, Ashok Mulchandani, and Wilfred Chen. Using genetic toggle switch to improve a cadmium specific whole cell biosensor. *in preparation*.

Cindy H. Wu, Yu-Chen Hwang, Wonkyu Lee, Thomas Wood, Marylynn Yates, Ashok Mulchandani, and Wilfred Chen. Detection of Recombinant *Pseudomonas putida* in Wheat Rhizosphere by Fluorescence *in situ* Hybridization. *Appl. Microbiol. Biotechnol.* *accepted*.

Cindy H. Wu, Ashok Mulchandani, Wilfred Chen. Versatile microbial surface-display for environmental remediation and biofuels production. *Trends Microbiol.* *in press*.

Cindy H. Wu, Thomas K. Wood, Ashok Mulchandani, and Wilfred Chen. Engineering plant-microbe symbiosis for rhizoremediation of heavy metal, *Appl. Environ. Microbiol.*, 72(2) 1129-1134, 2006.

Jan Kostal, Rosanna Yang, **Cindy H. Wu**, Ashok Mulchandani, and Wilfred Chen. Enhanced Arsenic Accumulation in Engineered Bacterial Cells Expressing ArsR. *Appl. Environ. Microbiol.*, 70, 4582-4587, 2004.

Weon Bae, **Cindy Wu**, Jan Kostal, Ashok Mulchandani, and Wilfred Chen. Enhanced mercury biosorption by bacterial cells with surface-displayed MerR. *Appl. Environ. Microbiol.*, 69, 3176-3180. 2003.

Wu C. et al. 1999. An integrated study of bacterial pollution of Santa Barbara County Beaches. *Proceedings of the 24th Annual Conference of the National Association of Environmental Professionals:* 31-41.

PRESENTATIONS

Microbial Populations Associated with Phosphate-Mediated Vadose Zone Sequestration of Strontium and Uranium. *American Geophysical Union Fall Meeting.* December 2007. San Francisco, California. Poster presentation.

Detection of Recombinant *Pseudomonas putida* in Wheat Rhizosphere by Fluorescence *in situ* Hybridization. *The 107th American Society for Microbiology General Meeting.* May 2007. Toronto. Poster presentation.

Fluorescence *in situ* hybridization (FISH) and flow cytometry for colonization efficiency quantification of a rhizoremediating *Pseudomonas*. *The 5th Battelle International Conference on Remediation of Chlorinated and Recalcitrant Compounds.* May 2006. Monterey California. Poster presentation.

Use of genetic toggle switch for a cadmium-specific whole-cell sensor. *Synthetic Biology 2.0 Conference*. Berkeley, CA. May 2006. Poster presentation.

Simultaneous remediation of cadmium and trichloroethylene using a recombinant rhizosphere bacterium. *The 5th International Chemical Congress of Pacific Basin Societies Pacificchem Conference*. December 2005. Honolulu Hawaii. Poster presentation.

Soil cadmium remediation using a metabolically engineered rhizosphere bacterium. *The 229th American Chemical Society National Meeting*. April 2005. San Diego California. Oral presentation.

Soil cadmium remediation using a genetically engineered rhizosphere bacterium. *The 4th Battelle International Conference on Remediation of Chlorinated and Recalcitrant Compounds*. May 2004. Monterey California. Poster presentation.

Bacterial biosensor for the detection of bioavailable cadmium. *UC Toxic Substance Research Teaching Program (UCTSRTP) Toxic Mechanism Lead Campus Component Meeting*. September 2003. Santa Fe, New Mexico. Oral Presentation.

An integrated study of bacterial pollution of Santa Barbara County Beaches. *The 24th Annual Conference of the National Association of Environmental Professionals*. June 1999. Kansas City, Missouri. Oral Presentation.

GRANTS AND FELLOWSHIPS RECEIVED

U.S. Environmental Protection Agency Science to achieve result Greater Research Opportunity Graduate Fellowship. 9/04-12/06. Up to \$37,000 per year awarded for tuition, research, travel and stipend.

UC Toxic Substance Research TP Mechanisms of Toxicity Lead Campus Traineeship. 7/03-6/04. \$16,660 awarded as stipend.

Dean's Fellowship. UC Riverside. 9/02-6/03. \$16,660 awarded as stipend.

UCSB Shoreline Preservation Fund. Isla Vista Ocean Monitoring Project. 2/00. Funded \$13,000 for research.

UC TSRTP Coastal Toxicology Component. Measurement of sediment coliform level. 9/98. Funded \$3347 for research.

AWARD AND HONORS

Third place finish for women in same age group. Annual Mission Inn 5K Run. Nov. 2005

T. Roy Fukuto Best Student Presentation Award. Annual Environmental Toxicology Graduate Program Symposium. UC Riverside. June 2005.

Best First Year Student Presentation. Annual Environmental Toxicology Graduate Program Symposium. June 2002.

PROFESSIONAL AFFLIATION

American Society of Microbiology

American Chemical Society

Society of Environmental Toxicology and Chemistry. Southern California Chapter.

ACADEMIC SERVICE AND VOLUNTEER ACTIVITIES

Bali Permaculture Program Volunteer. Indonesian Development of Education and Permaculture. 11/2006.

Annual Symposium Planning Committee. Environmental Toxicology Graduate Program. UC Riverside. 2004, 2006.

Volunteer Naturalist - National Oceanic and Atmospheric Administration. Channel Island National Sanctuary. 01/00 – 06/2001.

Events Director - Students, Professionals, Academic Concerned about the Environment (SPACE). 9/98 – 6/99.

Graduate Student Representative - Biosafety Committee. Environmental Health and Services. University of California, Santa Barbara. 10/97 – 6/99.

Volunteer Researcher – University Research Expedition Program. Costa Rica. Manatee Population Survey. 5/97 – 6/97.